

USPTO Customer No. 25280
Serial No: 10/679,239

Inventor(s): Mannion et al
Case No: 5647

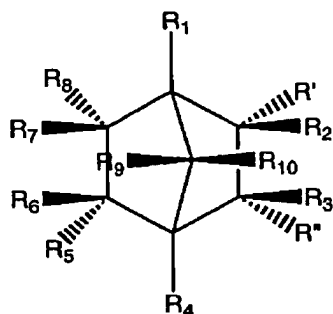
IN THE CLAIMS

1. (Currently Amended) A thermoplastic formulation formed by combining:
comprising:

(a) a polymer; and

(b) at least one small particle size nucleator compound, said compound
conforming conforming to the structure of Formula (I) below:

(I)



wherein R₁, R₂, R₃, R₄, R₅, R₆, R₇, R₈, R₉, and R₁₀ are independently ~~individually~~ selected from the group consisting of:

hydrogen, C₁-C₉ alkyl, hydroxy, C₁-C₉ alkoxy, C₁-C₉ alkyleneoxy, amine, and C₁-C₉ alkylamine, halogen, phenyl, alkylphenyl, and geminal or vicinal C₁-C₉ carbocyclics
having up to nine carbon atoms,

wherein R' and R'' are the same or different and are independently ~~individually~~
selected from the group consisting of hydrogen, C₁-C₃₀ alkyl, hydroxy, amine,
polyamine, polyoxyamine, C₁-C₃₀ alkylamine, phenyl, halogen, C₁-C₃₀ alkoxy, C₁-C₃₀
polyoxyalkyl, and esters: C(O)-NR₁₁, C(O)O-R''', and C(O)O-R'''₁₇ and

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(c) wherein said small size nucleating compound is intimately associated with an anticaking agent, said anticaking agent being provided in a weight ratio of anticaking agent to nucleating compound of from about 10:90 to about 30:70.

~~wherein R_{11} is selected from the group consisting of C_1 - C_{30} alkyl, hydrogen, C_1 - C_{30} alkoxy, and C_1 - C_{30} polyoxyalkyl, and~~

~~wherein R''' is selected from the group consisting of hydrogen, a metal ion (such as, without limitation, Na^+ , K^+ , Li^+ , Ag^+ and any other monovalent ions), an organic cation (such as ammonium as one non-limiting example), polyoxy- C_2 - C_{18} -alkylene, C_1 - C_{30} alkyl, C_1 - C_{30} alkylene, C_1 - C_{30} alkyleneoxy, a steroid moiety (for example, cholesterol), phenyl, polyphenyl, C_1 - C_{30} alkylhalide, and C_1 - C_{30} alkylamine; wherein at least one of R' and R'' is either $C(O)-NR_{11}C(O)O-R'''$ or $C(O)O-R'''$,~~

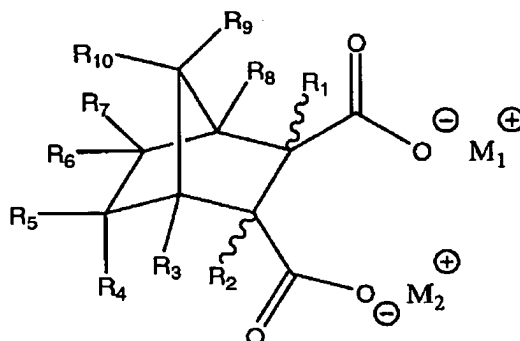
~~wherein if both R' and R'' are $C(O)O-R'''$ then R''' both R' and R'' may be combined into a single bivalent metal ion (such as Ca^{2+} , as one non-limiting example) or a single trivalent metal overbase (such as $Al-OH$, for one non-limiting example), and at least one anticaking agent.~~

2. (Currently Amended) The thermoplastic formulation of Claim 1 wherein said small particle size nucleating compound additionally conforms to the structure of Formula (II)

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(II)



wherein M_1 and M_2 are the same or different and are independently selected from the group consisting of metal or organic cations ~~or the two metal ions are unified into a single metal ion (bivalent, for instance, such as calcium, for example), and~~

wherein R_1 , R_2 , R_3 , R_4 , R_5 , R_6 , R_7 , R_8 , R_9 , and R_{10} are independently ~~individually~~ selected from the group consisting of:

hydrogen, C_1 - C_9 alkyl, hydroxy, C_1 - C_9 alkoxy, C_1 - C_9 alkyleneoxy, amine, and C_1 - C_9 alkylamine, halogen, phenyl, alkylphenyl, and ~~geminal or vicinal C_1 - C_9 carbocyclic, having up to 9 carbon atoms. Preferably, the metal cations are selected from the group consisting of calcium, strontium, barium, magnesium, aluminum, silver, sodium, lithium, rubidium, potassium, and the like.~~

3. (Currently Amended) The thermoplastic formulation of Claim 1 wherein said ~~metal or organic cation is a metal cation selected from the group consisting of Group I~~

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~~and Group II metal ions.~~ ratio of said anticaking agent to said small size nucleating compound is about 20:80.

4. (Currently Amended) The thermoplastic formulation of Claim 3 wherein said metal cation is selected from the group consisting of sodium, potassium, calcium, lithium, rubidium, barium, magnesium, ~~and~~ strontium, silver, zinc, and aluminum.

5. (Currently Amended) ~~The~~ thermoplastic formulation of Claim 4 wherein ~~said metal cation is sodium.~~ claim 1 wherein said nucleating agent is provided in a D95 particle size of less than or equal to about 10 micrometers at a mean volume diameter (MVD) of less than about 7.5.

6. (Currently Amended) ~~The~~ thermoplastic formulation of Claim 1 wherein ~~said said anticaking agent~~ anticaking agent is is selected from the group of agents consisting of: silica gel, talc, dihydrotalcite, and metal carboxylic acids, ~~and any mixtures thereof.~~

7. (Currently Amended) ~~The~~ thermoplastic formulation of Claim 6 wherein said anticaking agent comprises ~~is a~~ silica gel.

8. (Currently Amended) The thermoplastic formulation ~~article~~ of Claim 1 wherein said polymer thermoplastic comprises a polyolefin.

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9. (Currently Amended) The thermoplastic formulation article of Claim 2 wherein said polymer thermoplastic comprises a polyolefin.

10. (Currently Amended) The thermoplastic formulation article of Claim 1 wherein said small size nucleator compound comprises disodium bicyclo [2.2.1] heptane- 2,3- dicarboxylate. ~~-6 wherein said thermoplastic comprises a polyolefin.~~

11. (Currently Amended) The thermoplastic formulation article of Claim 2 ~~8~~ wherein said small size nucleator compound comprises disodium bicyclo [2.2.1] heptane- 2,3- dicarboxylate. polyolefin is a polypropylene.

12. (Currently Amended) The thermoplastic formulation article of Claim 9 wherein said polyolefin comprises polypropylene. ~~wherein said polyolefin is a polypropylene.~~

13. (Currently Amended) ~~The~~ thermoplastic formulation article of Claim 10 wherein said polyolefin comprises is a polypropylene.

14. (New) The thermoplastic formulation of claim 1 wherein said small size nucleator compound is comprised of particles having a D95 size of less than or equal to about 5 microns at a mean volume diameter (MVD) of less than or equal to about 3.

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15. (New) The thermoplastic formulation of claim 2 wherein said small size nucleator compound is comprised of particles having a D95 size of less than or equal to about 5 microns at a mean volume diameter (MVD) of less than or equal to about 3.

16. (New) The thermoplastic formulation of claim 15 wherein said anticaking agent and small size nucleator agent are provided in a ratio of nucleator compound to anticaking agent of about 80:20.

17. (New) The thermoplastic formulation of claim 15 wherein said nucleator compound comprises disodium bicyclo [2.2.1] heptane-2,3 dicarboxylate.

18. (New) The thermoplastic formulation of claim 16 wherein said nucleator compound comprises disodium bicyclo [2.2.1] heptane-2,3 dicarboxylate.

19. (New) The thermoplastic formulation of claim 18 wherein said polymer comprises polypropylene.